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Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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UTILITY PATENT APPLICATION TRANSMITTAL (Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))	Attorney Docket No.	6986-20035
	First Inventor or Application Identifier	Herbert Henze
	Title	DRAG APPARATUS FOR CONVENTIONAL AND SPINNING
Express Mail Label No.		EM144009010US

APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents.	ADDRESS TO: Assistant Commissioner for Patents Box Patent Application Washington, DC 20231
1. <input checked="" type="checkbox"/> * Fee Transmittal Form (e.g., PTO/SB/17) (Submit an original and a duplicate for fee processing)	5. <input type="checkbox"/> Microfiche Computer Program (Appendix)
2. <input checked="" type="checkbox"/> Specification [Total Pages 10] (preferred arrangement set forth below) <ul style="list-style-type: none">- Descriptive title of the invention- Cross References to Related Applications- Statement Regarding Fed sponsored R & D- Reference to Microfiche Appendix- Background of the invention- Brief Summary of the invention- Brief Description of the Drawings (if filed)- Detailed Description- Claim(s)- Abstract of the Disclosure	6. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary) <ul style="list-style-type: none">a. <input type="checkbox"/> Computer Readable Copyb. <input type="checkbox"/> Paper Copy (identical to computer copy)c. <input type="checkbox"/> Statement verifying identity of above copies
3. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Sheets 7]	ACCOMPANYING APPLICATION PARTS 7. <input checked="" type="checkbox"/> Assignment Papers (cover sheet & document(s)) 8. <input type="checkbox"/> 37 C.F.R. § 3.73(b) Statement (when there is an assignee) <input checked="" type="checkbox"/> Power of Attorney 9. <input type="checkbox"/> English Translation Document (if applicable) 10. <input type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449 <input type="checkbox"/> Copies of IDS Citations 11. <input type="checkbox"/> Preliminary Amendment 12. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) (Should be specifically itemized) 13. <input checked="" type="checkbox"/> * Small Entity Statement(s) <input type="checkbox"/> Statement filed in prior application, Status still proper and desired (PTO/SB/09-12) 14. <input type="checkbox"/> Certified Copy of Priority Document(s) (if foreign priority is claimed) 15. <input type="checkbox"/> Other:
4. Oath or Declaration [Total Pages 2] <ul style="list-style-type: none">a. <input checked="" type="checkbox"/> Newly executed (original or copy)b. <input type="checkbox"/> Copy from a prior application (37 C.F.R. § 1.63(d)) (for continuation/divisional with Box 16 completed)<ul style="list-style-type: none">i. <input type="checkbox"/> DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).	
* NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).	

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. _____

Prior application information: Examiner _____

Group / Art Unit: _____

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS					
<input type="checkbox"/> Customer Number or Bar Code Label _____ or <input type="checkbox"/> Correspondence address below					
(Insert Customer No. or Attach bar code label here)					
Name	Frank J. Benasutti				
Address	17294 Bermuda Village Drive				
City	Boca Raton	State	FL	Zip Code	33487
Country	USA	Telephone	561-994-5959	Fax	561-994-5990

Name (Print/Type)	Frank J. Benasutti	Registration No. (Attorney/Agent)	24,155
Signature	<i>Frank J. Benasutti</i>	Date	June 14, 2000

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231.

Applicant: Penn Fishing Tackle Manufacturing Co.

Title: DRAG APPARATUS FOR CONVENTIONAL AND SPINNING REELS

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) and 1.27(c))- SMALL BUSINESS CONCERN**

I hereby declare that I am an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF SMALL BUSINESS CONCERN: Penn Fishing Tackle Manufacturing Company

ADDRESS OF SMALL BUSINESS CONCERN: 3028 West Hunting Park Avenue

Philadelphia, PA 19132

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has power to control the other, or a third party or parties controls or has power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention entitled:

DRAG APPARATUS FOR CONVENTIONAL AND SPINNING REELS

by inventor Herbert Henze and described in the specification filed herewith with title as listed above.

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by

[illegible]

SIGNATURE Herbert O Henry DATE June 13, 2000

pennfish\verstmt.035

Practitioner's Docket No. 6986-20035

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s): Herbert Henze

WARNING: 37 C.F.R. § 1.41(a)(1) points out:

"(a) A patent is applied for in the name or names of the actual inventor or inventors.

"(1) The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by § 1.63, except as provided for in § 1.53(d)(4) and § 1.63(d). If an oath or declaration as prescribed by § 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to § 1.53(b), unless a petition under this paragraph accompanied by the fee set forth in § 1.17(f) is filed supplying or changing the name or names of the inventor or inventors."

For (title): DRAG APPARATUS FOR CONVENTIONAL AND SPINNING REELS

CERTIFICATION UNDER 37 C.F.R. § 1.10*
(Express Mail label number is mandatory.)
(Express Mail certification is optional.)

I hereby certify that this New Application Transmittal and the documents referred to as attached therein are being deposited with the United States Postal Service on this date June 14, 2000, in an envelope as "Express Mail Post Office to Addressee," mailing Label Number EMI44009010US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

FRANK J. BENASUTTI

(type or print name of person mailing paper)

Frank J. Benasutti
Signature of person mailing paper

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. § 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

***WARNING:** Each paper or fee filed by "Express Mail" **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. § 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

(New Application Transmittal [4-1]—page 1 of 11)

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The PTO did not receive the following listed item(s) page 2, 3, 4 and 11 of transmittal.

6. Inventorship Statement

WARNING: If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.

The inventorship for all the claims in this application are:

☒ The same.

or

☐ Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,

☐ is submitted.

☐ will be submitted.

7. Language

NOTE: An application including a signed oath or declaration may be filed in a language other than English. An English translation of the non-English language application and the processing fee of \$130.00 required by 37 C.F.R. § 1.17(k) is required to be filed with the application, or within such time as may be set by the Office. 37 C.F.R. § 1.52(d).

☒ English

☐ Non-English

☐ The attached translation includes a statement that the translation is accurate. 37 C.F.R. § 1.52(d).

8. Assignment

☒ An assignment of the invention to Penn Fishing Tackle Manufacturing Co.

☒ is attached. A separate ☒ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

☐ will follow.

NOTE: "If an assignment is submitted with a new application, send two separate letters—one for the application and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).

WARNING: A newly executed "CERTIFICATE UNDER 37 C.F.R. § 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.

(New Application Transmittal [4-1]—page 5 of 11)

9. Certified Copy

Certified copy(ies) of application(s)

Country	Appln. No.	Filed
Country	Appln. No.	Filed
Country	Appln. No.	Filed

from which priority is claimed

☐ is (are) attached.

☐ will follow.

NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 C.F.R. § 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. § 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

10. Fee Calculation (37 C.F.R. § 1.16)

A. ☒ Regular application

CLAIMS AS FILED						
Number filed	Number Extra			Rate	Basic Fee 37 C.F.R. 1.16(a)	
					\$760.00	\$630.00
Total						
Claims (37 C.F.R. § 1.16(c))	12	- 20 =	0	×	\$ 18.00	0
Independent						
Claims (37 C.F.R. § 1.16(b))	1	- 3 =	0	×	\$ 78.00	0
Multiple dependent claim(s), if any (37 C.F.R. § 1.16(d))						
			0	+	\$260.00	0

☐ Amendment cancelling extra claims is enclosed.

☐ Amendment deleting multiple-dependencies is enclosed.

☐ Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 C.F.R. § 1.16(d).

Filing Fee Calculation \$ 690.00

B. ☐ Design application
(\$310.00—37 C.F.R. § 1.16(f))

Filing Fee Calculation \$

C. ☐ Plant application
(\$480.00—37 C.F.R. § 1.16(g))

Filing fee calculation \$

11. Small Entity Statement(s)

- ☒ Statement(s) that this is a filing by a small entity under 37 C.F.R. § 1.9 and 1.27 is (are) attached.

WARNING: "Status as a small entity must be specifically established in each application or patent in which the status is available and desired. Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. The refiling of an application under § 1.53 as a continuation, division, or continuation-in-part (including a continued prosecution application under § 1.53(d)), or the filing of a reissue application requires a new determination as to continued entitlement to small entity status for the continuing or reissue application. A nonprovisional application claiming benefit under 35 U.S.C. § 119(e), 120, 121, or 365(c) of a prior application, or a reissue application may rely on a statement filed in the prior application or in the patent if the nonprovisional application or the reissue application includes a reference to the statement in the prior application or in the patent and status as a small entity is still proper and desired. The payment of the small entity basic statutory filing fee will be treated as such a reference for purposes of this section." 37 C.F.R. § 1.28(a)(2).

WARNING: "Small entity status must not be established when the person or persons signing the . . . statement can *unequivocally* make the required self-certification." M.P.E.P., § 509.03, 6th ed., rev. 2, July 1996 (emphasis added).

(complete the following, if applicable)

- ☐ Status as a small entity was claimed in prior application
_____/_____, filed on _____, from which benefit
is being claimed for this application under:

35 U.S.C. § ☐ 119(e),
☐ 120,
☐ 121,
☐ 365(c),

and which status as a small entity is still proper and desired.

- ☐ A copy of the statement in the prior application is included.

Filing Fee Calculation (50% of A, B or C above)

\$ 345.00

NOTE: Any excess of the full fee paid will be refunded if small entity status is established and a refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendable under § 1.136. 37 C.F.R. § 1.28(a).

12. Request for International-Type Search (37 C.F.R. § 1.104(d))

(complete, if applicable)

- ☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13. Fee Payment Being Made at This Time

☐ Not Enclosed

☐ No filing fee is to be paid at this time.

(This and the surcharge required by 37 C.F.R. § 1.16(e) can be paid subsequently.)

☒ Enclosed

☒ Filing fee \$ 345.00

☒ Recording assignment
(\$40.00; 37 C.F.R. § 1.21(h))
(See attached "COVER SHEET FOR
ASSIGNMENT ACCOMPANYING NEW
APPLICATION".) \$ 40.00

☐ Petition fee for filing by other than all the
inventors or person on behalf of the inventor
where inventor refused to sign or cannot be
reached
(\$130.00; 37 C.F.R. §§ 1.47 and 1.17(i)) \$

☐ For processing an application with a
specification in
a non-English language
(\$130.00; 37 C.F.R. §§ 1.52(d) and 1.17(k)) \$

☐ Processing and retention fee
(\$130.00; 37 C.F.R. §§ 1.53(d) and 1.21(l)) \$

☐ Fee for international-type search report
(\$40.00; 37 C.F.R. § 1.21(e)) \$ ~~40.00~~

NOTE: 37 C.F.R. § 1.21(l) establishes a fee for processing and retaining any application that is abandoned for failing to complete the application pursuant to 37 C.F.R. § 1.53(f) and this, as well as the changes to 37 C.F.R. §§ 1.53 and 1.78(a)(1), indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid, or the processing and retention fee of § 1.21(l) must be paid, within 1 year from notification under § 53(f).

Total fees enclosed \$ 385.00

14. Method of Payment of Fees

☒ Check in the amount of \$ 385.00

☐ Charge Account No. _____ in the amount of
\$ _____

A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 C.F.R. § 1.22(b).

15. Authorization to Charge Additional Fees

WARNING: If no fees are to be paid on filing, the following items should not be completed.

WARNING: Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

- ☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 02-3295:

- ☐ 37 C.F.R. § 1.16(a), (f) or (g) (filing fees)
☐ 37 C.F.R. § 1.16(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

- ☐ 37 C.F.R. § 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)
☐ 37 C.F.R. § 1.17(a)(1)–(5) (extension fees pursuant to § 1.136(a)).
☐ 37 C.F.R. § 1.17 (application processing fees)

NOTE: “. . . A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission.” 37 C.F.R. § 1.136(a)(3).

- ☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

NOTE: 37 C.F.R. § 1.28(b) requires “Notification of any change in status resulting in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying, . . . the issue fee. . . .” From the wording of 37 C.F.R. § 1.28(b), (a) notification of change of status must be made even if the fee is paid as “other than a small entity” and (b) no notification is required if the change is to another small entity.

16. Instructions as to Overpayment

NOTE: "... Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

- ☒ Credit Account No. 02-3295
☐ Refund

004790" 52545560

Reg. No. 24,155

Tel. No. (561) 994-5959

Customer No.


SIGNATURE OF PRACTITIONER

Frank J. Benasutti

(type or print name of attorney)

17294 Bermuda Village Drive
P.O. Address

Boca Raton, FL 33487

DRAG APPARATUS FOR CONVENTIONAL AND SPINNING REELS

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to drag mechanisms for conventional and spinning reels and, more particularly, to a drag apparatus utilizing drag washers of different materials.

Description of the Prior Art

The prior art teaches fishing reels showing stacks of drag washers comprising metal washers having peripheral protrusions alternating with washers made of a friction material without peripheral protrusions. *See*, for example, U.S. Patent Nos. 4,488,689, 4,796,828, 3,682,411, 5,603,465, and 4,728,054, all of which pertain to spinning style fishing reels; and U.S. Patent No. 2,760,736 which pertains to a motor-driven spool and clutch mechanism for a fishing reel.

In a conventional reel, the drag works as a clutch between the main gear and the gear stud. The drag setting will determine the torque needed to rotate the main gear relative to the gear stud. In prior art reels, the drag consists of alternating friction material washers and metal washers nested in a pocket in the main gear. A typical stack would consist of a friction material washer, a metal washer keyed to the gear stud, another friction material washer, a metal washer keyed to the main gear, a third friction material washer, and finally a second metal washer keyed to the gear stud. When the main gear rotates relative to the gear stud, three drag surfaces work to resist this rotation. The main gear turns relative to the first washer keyed to the gear stud. The first washer keyed to the gear stud turns relative to the first washer keyed to the main gear; and the first washer keyed to the main gear turns relative to the second washer keyed to the gear stud. These three pairs sandwich the three friction material washers; resulting in only three effective drag surfaces.

It is desirable to increase the performance of these drag mechanisms. These mechanisms all exhibit a slipping characteristic; that is, the prior art mechanisms stuck and then slipped when the drag was used. Only one side of each friction material washer was **forced** to move relative to its adjoining washer.

Accordingly, it is an object of this invention to improve upon the drag produced by that mechanism and greatly improve the effectiveness of the drag apparatus.

A further object of this invention is to provide a ready means of varying the drag by varying the arrangements of the drag washers to adjust for different kinds of fishing; where the same number of washers are used in the drag mechanism.

These and other objects of the invention will become apparent from the following description with reference to the accompanying drawings.

SUMMARY OF THE INVENTION

In my improved drag stack, the friction material washers are made in a rigid form. Protrusions are added to the outside diameter of these drag washers. The protrusions or ears are keyed within slots around the perimeter of the main gear pocket in order to prevent rotation of the friction material washers relative to the main gear. A drag stack consisting of the same number of components as the prior art stack described above would be made up of a friction material washer, a metal washer keyed to the gear stud, a second friction material washer, a second metal washer keyed to the gear stud, a third friction material washer, and a third metal washer keyed to the gear stud. In this improved configuration, when the main gear rotates relative to the gear stud, five drag surfaces work to resist this rotation. A first working surface of a first friction material drag washer turns relative to the adjoining surface of a first metal washer keyed to the gear stud. The other

surface of the first keyed metal washer turns relative to an adjoining surface of second friction material drag washer. The other surface of the second friction material drag washer turns relative to the adjacent surface of the second keyed metal washer. The other surface of the second keyed metal washer turns relative to the adjoining surface of the third friction material washer. Finally, an adjacent surface of the third metal keyed washer turns relative to an adjacent surface of the third friction material drag washer, resulting in five effective drag surfaces. All friction material washers that adjoin metal drag washers are forced to rotate relative to them.

The same drag improvement can also be adapted to increase drag torque in fixed spools. Inside diameters of the metal washers are keyed to the spool stud shaft, while the outside diameters of the friction material drag washers are keyed to the spool by peripheral radially extending ears..

This drag stack can be used with both conventional and spinning reels. The benefit of this drag is that on a typical reel utilizing three washers made from a friction material, there will be a 60% or more increase in the drag's torque for a given normal force placed on the drag stack, than would have been obtained by a prior art stack.

Another useful and innovative attribute of the improved drag system is the ability to arrange drag washers according to expected fishing conditions.

Simply by rearranging the layers of washers, a user can obtain one working frictional surface for a light, sensitive drag of 2-4 pounds tension (level 1), while another arrangement will provide the working frictional surfaces for a medium drag of 4-8 pounds (level 3) tension of the fishing line. Yet another arrangement will allow the maximum of five working frictional surfaces for a heavy drag of 6-12 (level 5) pounds tension of the fishing line. See Figures 1, 2 and 3 and the plot 555 - Drag Test, Fig. 4.

Thus, the unique shape of the fiber washers allows the user to increase maximum drag 60% more than the standard prior art style drag washer stack, while still allowing the user to attenuate the drag for light fishing application.

In accordance with my invention, both sides of the friction material are active. This is because the drag washers which are eared are made of a friction material.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows an exploded perspective view of a drag washer apparatus for use in a revolving spool reel;

Figure 2 shows the apparatus of Figure 1 with a different arrangement of washers;

Figure 3 shows the apparatus of Figure 1 with a different arrangement of washers;

Figure 4 is a chart of a drag test conducted with the washers shown in Figures 1, 2 and 3;

Figure 5 is an exploded perspective view of a portion of a conventional revolving spool reel mechanism in accordance with my invention;

Figure 6 is an exploded perspective view of a portion of a spinning or fixed reel mechanism in accordance with an alternate embodiment of my invention;

Figure 7 is a plot of test data showing results using prior art drags as opposed to the variable drag of the present invention;

Figures 8A, 8B and 8C are enlarged views of a friction drag washer showing preferred dimensions; and

Figures 9A and 9B are enlarged views of a metal drag washer showing preferred dimensions.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The main use of the preferred embodiment of my invention is to provide a clutch between

a main gear and a gear stud in a revolving spool reel (a portion of which as shown in Figure 5). Those parts comprise a screw 121, a ball bearing 120, a gear stud 134, a bearing retainer 173, retaining screws 163, a ratchet spacer 198, a fiber washer 104, a main gear 105, a plurality of friction drag washers 18, and a plurality of metal drag washers 16.

The material of which the parts 18 are made is most preferably a composite material having a center laminated portion comprised of fiberglass with a binder resin such as epoxy and outer laminated graphite (carbon) portions forming the entire radial friction surfaces. The fiber composition is three layers of epoxy impregnated glass fibers, which are sandwiched between layers of woven graphite cloth. The laid-up drag material is compressed and cured to produce the drag material. The final thickness is .050 inches, plus or minus .005 inches, and has a high co-efficient of friction; most preferably 0.14. This material must be of sufficient strength to prevent the ears 22 from collapsing due to the forces exerted by the drag mechanism. The preferred dimensions of a drag friction washer are shown in Figures 8A, 8B and 8C.

The metal washers (keyed to the gear stud) are made from 302 stainless steel. The preferred dimensions of the drag washer are shown in Figures 9A and 9B.

By arranging these washers in the staggered fashion shown, *i.e.*, so that the keyed metal washers 16 have their metal surfaces in contact with the friction surfaces of the eared friction drag washers 18, the advantages of this invention may be obtained.

This mechanism dramatically increases the drag in this type of device. See the test results plotted on Figure 7 which shows a slope of 19.2 pounds per turn using the drag mechanism of the present invention as opposed to the slope of 9.8 pounds per turn when using the prior art drag system. The diameters and numbers of washers used in both tests were identical.

Alternate arrangements of my invention are shown in Figures 1, 2 and 3.

In Figure 1, three eared friction drag washers are shown adjacent to one another and three metal washers are shown adjacent to one another, such that only one friction drag surface engages one metal surface. This arrangement provides for the minimal drag using this number of washers.

In another alternate arrangement shown in Figure 2, by simply changing the position of one eared friction drag washer with respect to one metal washer, the arrangement becomes one in which two eared friction drag washers are adjacent to one another and two metal washers are adjacent to one another in the stack. In this way, the amount of friction employed by the drag mechanism can be increased, even though the stack still takes up the same amount of space within the reel.

In the final arrangement shown in Figure 3 identified as level 5, the stack is arranged in the manner shown in Figure 5 to provide for the maximum amount of friction drag for this type of use.

These arrangements demonstrate the importance of my invention in that it gives the user the flexibility to adjust drag; albeit the user has to take the drag mechanism apart in order to rearrange the washers.

Referring to Figure 6, it shows an exploded perspective view of a portion of a spinning reel showing a drag washer mechanism in accordance with an alternate embodiment of my invention. This comprises a spool stud shaft 10 having a fixed spool 14 including a gear 26 as part thereof. Mounted about this shaft 10, there are metal washers 16 keyed to it and eared friction drag washers 18 keyed to the main gear. On the outside end of the shaft, there is a drag adjustment knob 20. The eared washers have peripheral ears 22 which engage ear slots 24 in the main gear 26. Spool shaft 10 has diametrically opposed flat portions 28 which are keyed into the opposed flat portions 30 of the metal washers 16 so that the metal washers rotate therewith. The principle of arrangement and

rearrangement of the washers is the same as that used in connection with the conventional revolving spool reel previously described.

CLAIMS

What is claimed is:

1. In a fishing reel having a main gear with key slots therein and a shaft and a drag mechanism using a stack of washers, an improved drag stack comprising a plurality of washers at least one of which being made of a friction imparting material having a high co-efficient of friction and ears extending from the periphery thereof for engagement with said key slots in said main gear; and at least one of which washers comprises a metallic washer in keyed engagement with said shaft passing through said gear, for engagement with said friction imparting material washer to provide drag.

2. The fishing reel of Claim 1 wherein at least two friction washers alternate with metal washers.

3. The fishing reel of Claim 1 wherein at least three friction washers alternate with metal washers.

4. The fishing reel of Claim 1 wherein the friction imparting material comprises a composite material having a center laminated portion comprised of fiberglass with a binder resin such as epoxy and outer laminated graphite portions forming the entire radial friction surfaces; said fiber composite material being three layers of epoxy impregnated glass fibers, which are sandwiched between layers of woven graphite cloth; compressed and cured to produce a drag material.

5. The fishing reel of Claim 1 wherein the metal drag washers are stainless steel.

6. The fishing reel of Claim 5 wherein the stainless steel washers have a diameter of approximately 1.120 inches, and a width of approximately 0.045 inches.

7. The invention of Claim 5 wherein the stainless steel washers have a diameter of approximately 1.120 inches, and a width of approximately 0.055 inches.

8. The fishing reel of Claim 4 wherein the friction imparting material washers have a radius of approximately 0.570 inches and a width of approximately 0.050 inches.

9. The fishing reel of Claim 4 wherein the friction imparting material washers have ears at approximately 60 degree intervals.

5 10. The fishing reel of Claim 1 wherein the friction material has a co-efficient of friction of approximately 0.14.

11. The fishing reel of Claim 1 wherein the fishing reel is a conventional rotating spool reel.

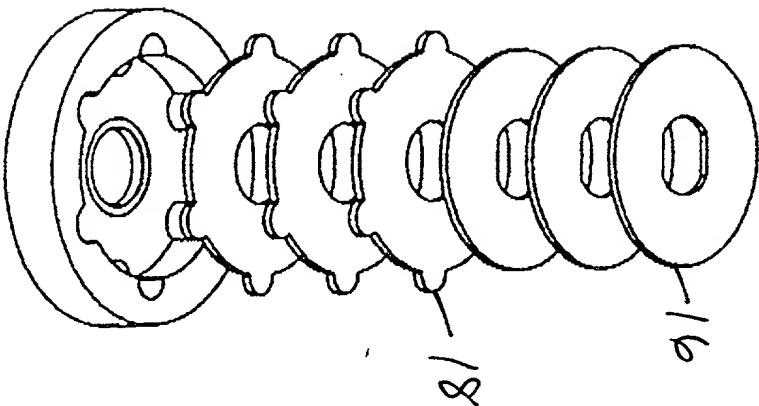
12. The fishing reel of Claim 1 wherein the fishing reel is a spinning fixed reel.

ABSTRACT

A drag mechanism in a fishing reel consists of a plurality of washers. Some of the washers are metal while others are made of a high friction co-efficient material and are keyed to the main drive gear in the reel by means of a plurality of ears extending from the periphery thereof. This can be applied to conventional and spinning reels. By rearranging the position of the metal washers and high friction washers, the drag can be varied.

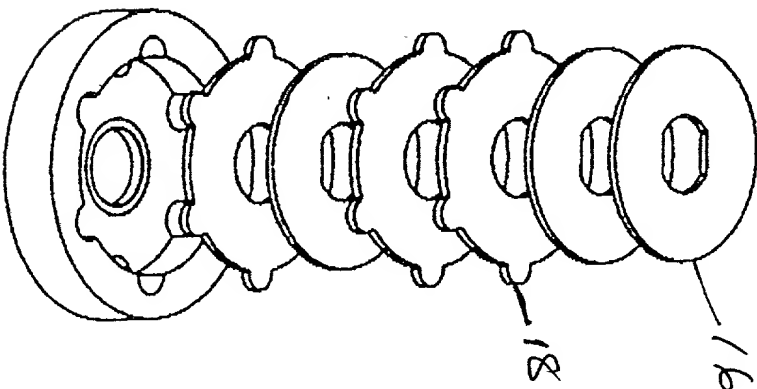
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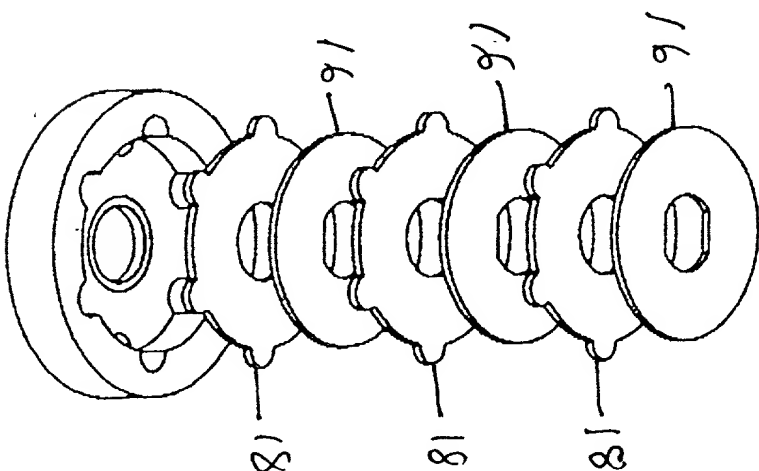
LEVEL 1

Fig. 1



LEVEL 3

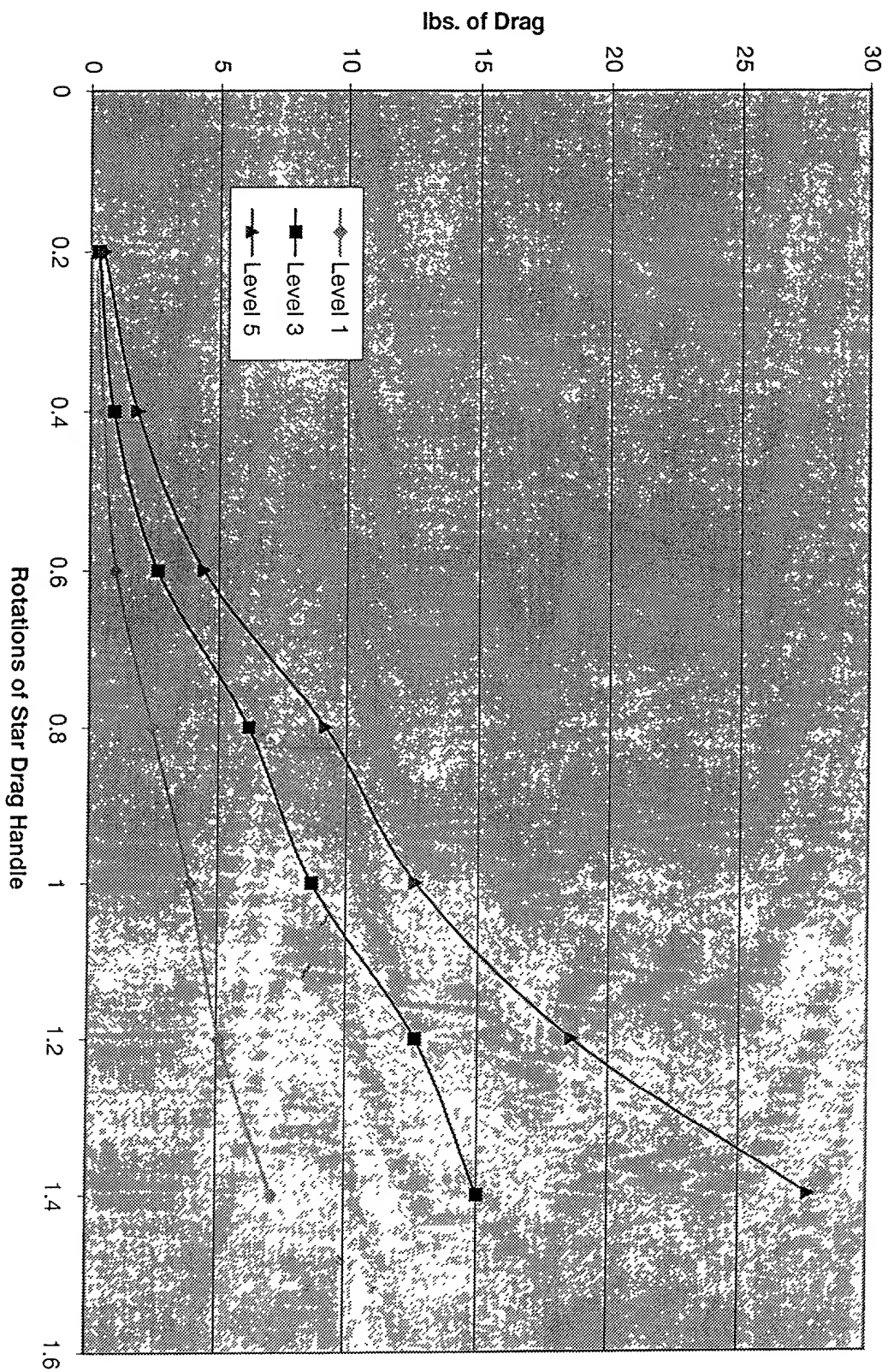
Fig. 2

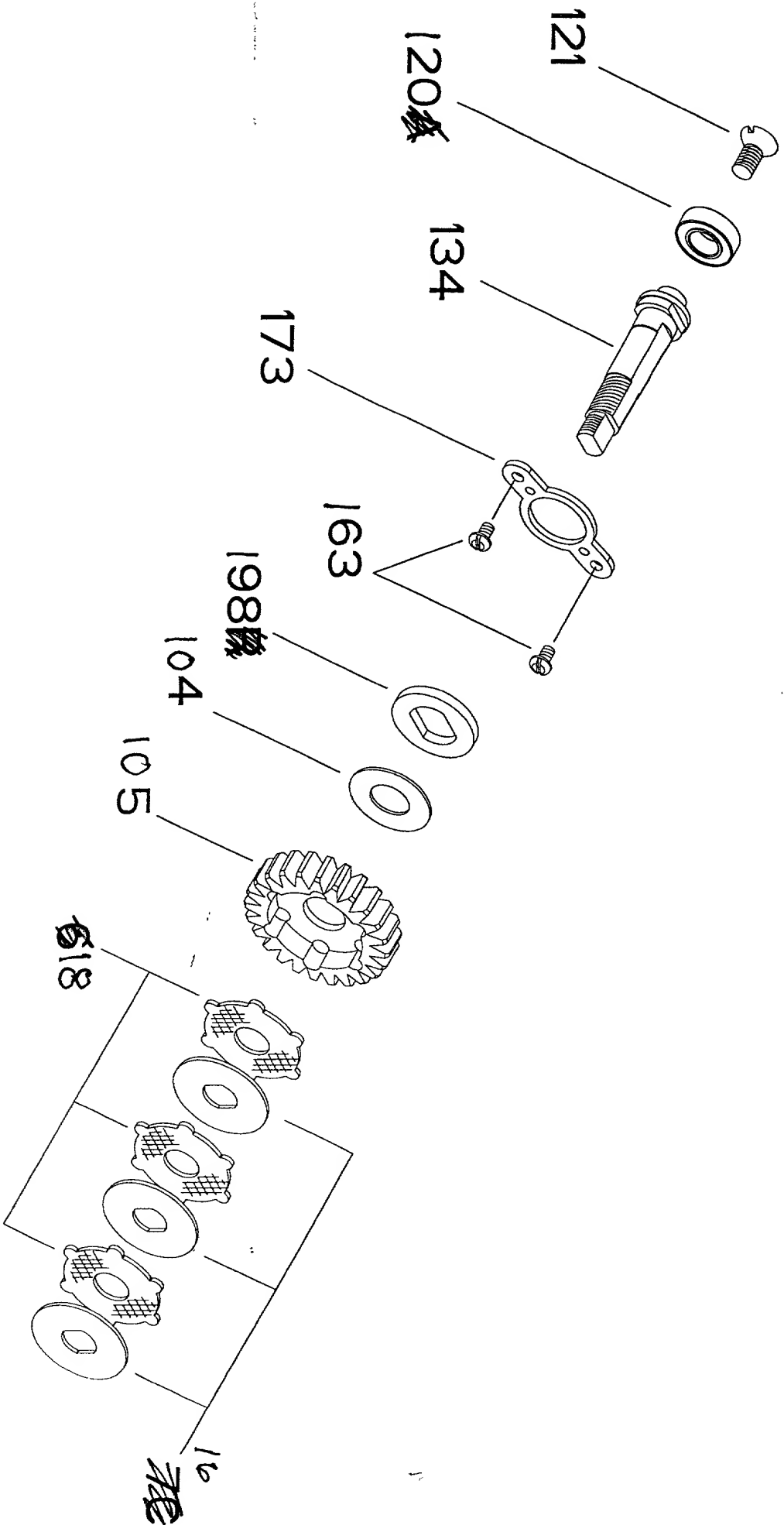


LEVEL 5

Fig. 3

555 - Drag Test





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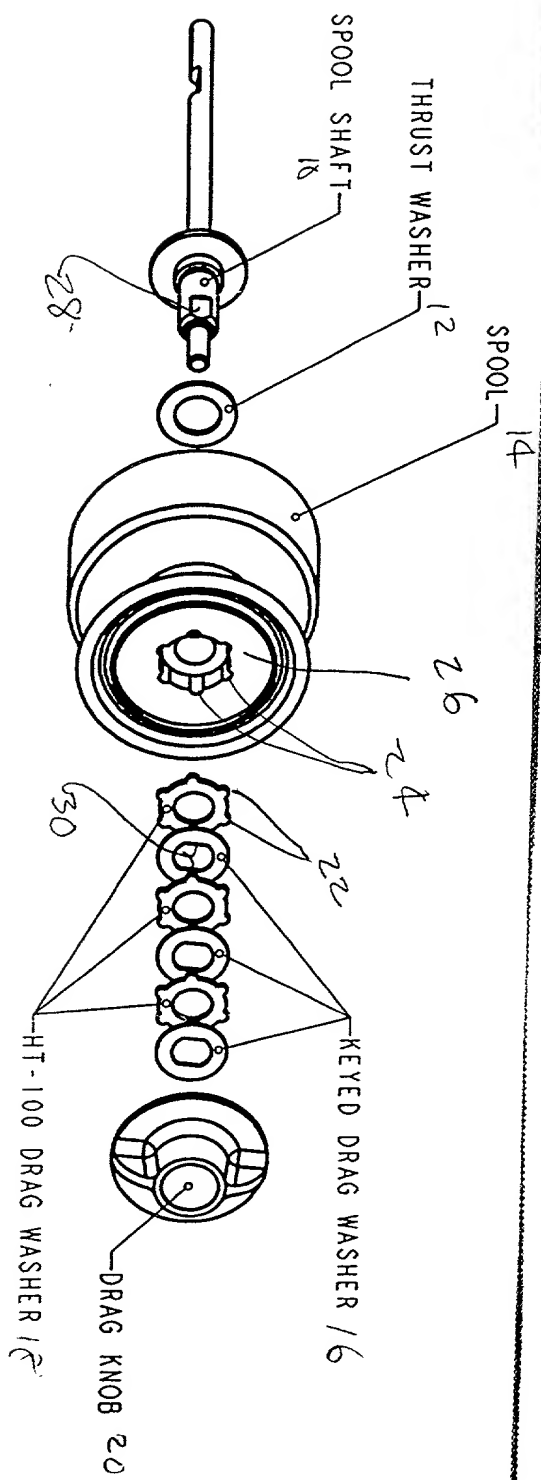
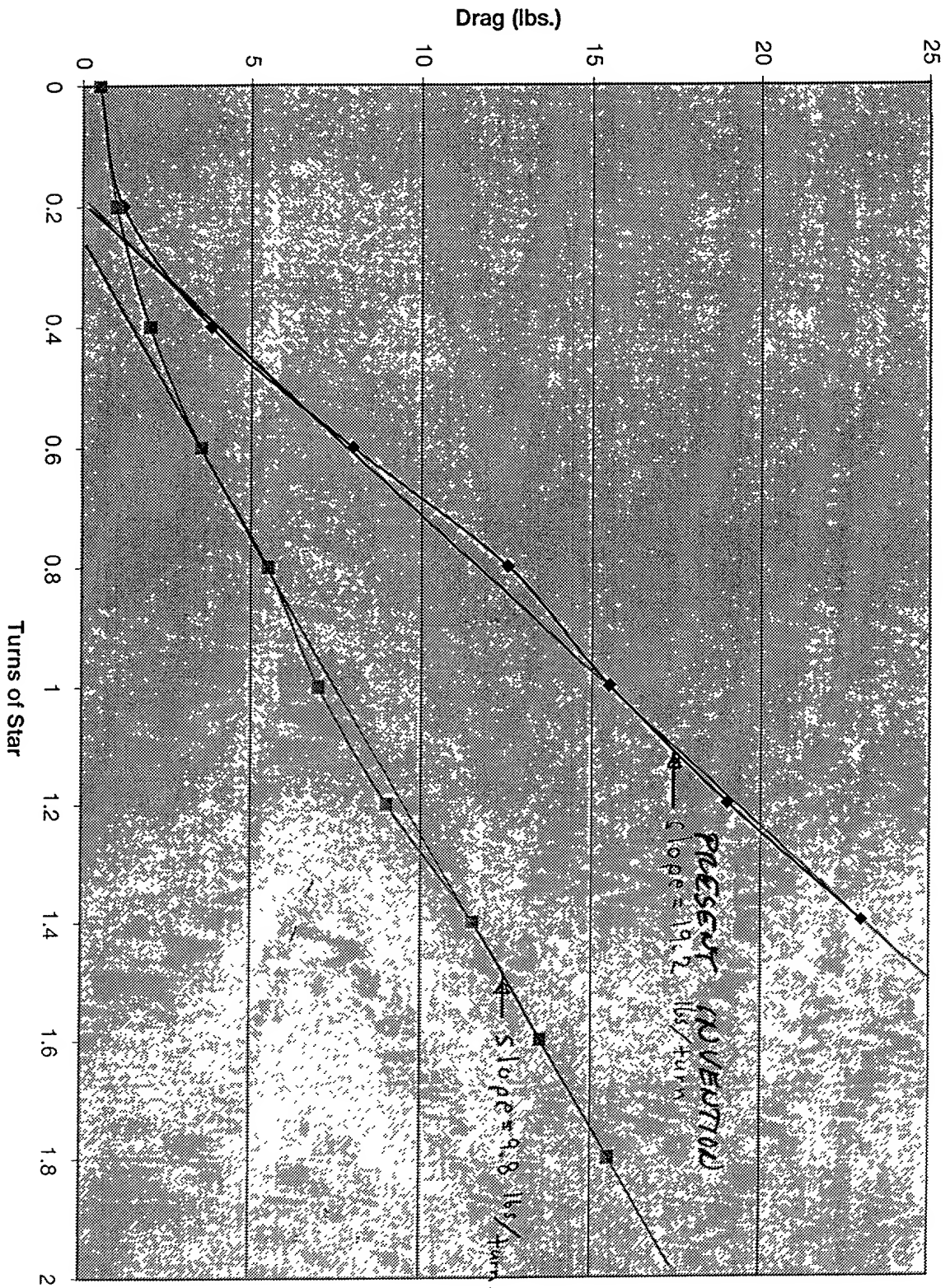


Fig. 6



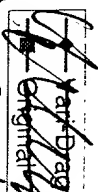

 J. H. D. G.
 Original
 Prior Art

Fig. 7
 03594525 061400

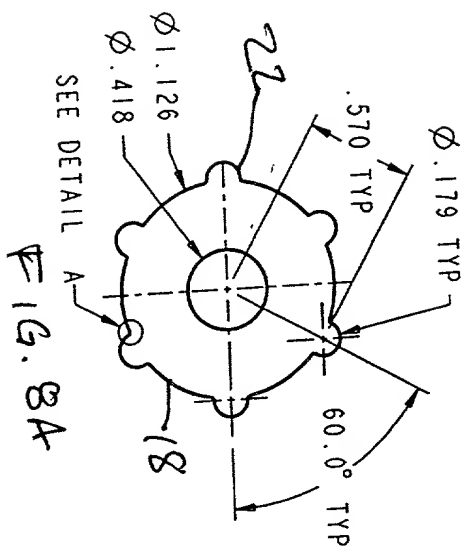
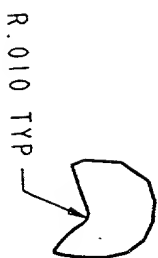


Fig. 8A



DETAIL A
SCALE 5.000

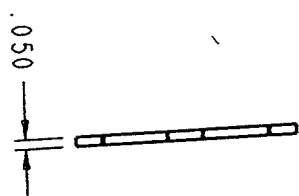


Fig. 8B

Fig. 8C

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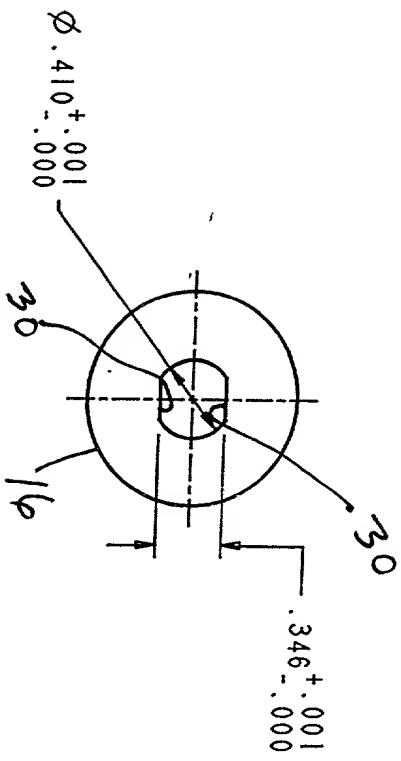


Fig. 9A

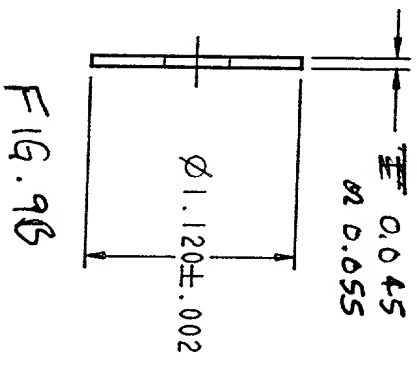


FIG. 9B

Attorney's Docket No.: 6986-20035

COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below-named inventor, I hereby declare that this is an original declaration for a patent application.

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original and joint inventor (if plural names are listed below) of the subject matter that is claimed, and for which a patent is sought on the invention entitled: **DRAG APPARATUS FOR CONVENTIONAL AND SPINNING REELS**, the specification, claims and informal drawings of which are attached hereto.

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information which is material to patentability as defined in 37, Code of Federal Regulations, Section 1.56, and which is material to the examination of this application.

POWER OF ATTORNEY

I hereby appoint the following attorney to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

Frank J. Benasutti, Esquire

Reg. No. 24,155

Send correspondence to:

Direct telephone calls to:

Benasutti, P.A.
17294 Bermuda Village Drive
Boca Raton, FL 33487

Frank J. Benasutti, Esquire
Tel.: 561-994-5959
Fax: 561-994-5990

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title of the United States Code, and that such wilful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

Full name of sole or first joint inventor:

Herbert
Given name

Middle initial or name

Henze
Family (or last) name

Inventor's signature: Herbert O. Henze

Date: June 13, 2000 Country of Citizenship: USA

Residence: 4130 Timber Lane, Philadelphia, PA 19144

Full name of second joint inventor:

Given name

Middle initial or name

Family (or last) name

Inventor's signature: _____

Date: _____ Country of Citizenship: _____

Residence: _____